



Main pathologies causing confiscation of equine livestock intended for human consumption

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Graphical Abstract

Annual survey of slaughter animals in slaughterhouses of the Valencian Community in 2015

PROVINCE	Bovine	Ovine	Caprine	Porcine	Equine	Poultry	Rabbits	TOTAL
Alicante	10.941	324.167	15.658	49.263	225	16.172	119	16.691.274
Castellón	5.119	214.109	16.183	97.018	2.411	18.201	1.596	20.132.382
Valencia	156.243	155.537	3.005	1.156.803	3.732	62.814	534	64.823.476
TOTAL	172.303	693.813	34.846	1.303.084	6.368	97.187	2.250	101.647.132

Abstract.

The horse is a herbivorous animal that is used for various purposes, one of them is the production of meat intended for human consumption. Worldwide, horse meat production is led by Asia, leaving Europe in third place. Spain is not a country with a great tradition of consumption of this meat, even so, 18,275 farms are dedicated to it, sacrificing 52,908 horses per year. Specifically, 6,368 horses are slaughtered approximately in a year in the Valencian Community. The objective of the present study is to determine, through ante-mortem and post-mortem inspection, the causes of the main seizures produced in equine livestock destined for human consumption, recognizing the lesions and taking the pertinent decision in each of the organs and parts of the animal. To this end, an experimental study was carried out in 794 horses in 2016 and during the months from January to April 2017. Data have been collected from the inspections carried out during the working day in the so-called “Daily Equine Inspection Part”, where each of the generated seizures and their causes are recorded. Knowing the sacrifices and the amount of seizures made, it is observed that total confiscation is relegated to a second plane and partial seizure is the predominant one. The lung is the most common partial seizure, followed by the liver. The main pathologies causing

	seizures are pneumonias, and a large number of cases are seized by decision of the official veterinarian.
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Introduction

Horses are animals that are used for various purposes. In countries in process of development they are used for transport or work, while in advanced countries they are used for racing, sports, entertainment, medicinal uses and even their meat is destined for human consumption.

Spain is not a country with a long tradition in horse meat consumption; it represents 0.2% of total meat consumption. The main producers of horse meat in Spain are Navarra, followed by Aragón and Cantabria, leaving the Valencian Community in fourth place. The horses destined to meat in this Community are 6,368, 225 are sacrificed in the province of Alicante, 2,411 animals in the province of Castellón and in Valencia the number of animals slaughtered amounts to 3,732.

Related to the human consumption of horse meat, the sanitary surveillance carried out by the slaughterhouse veterinary inspector aims to avoid possible zoonoses by consumption of foods of animal origin, in addition to carry out a registry of the prevalence and the behavior or tendency of the most commonly pathologies detected in animals. This surveillance is carried out through official controls with an ante-mortem inspection of the animals and a post-mortem inspection of the canals and their viscera. The purpose of ante-mortem inspection in the slaughterhouse is to differentiate healthy live animals of those who have symptoms, signs or injuries that indicate that they are carriers of some danger for human health or animal health. Animals that are given the opinion of not suitable for human consumption in ante-mortem inspection do not enter to the food chain and, therefore, post-mortem inspection can not be performed. Animals that are apt in the ante-mortem inspection, enter the slaughter chain and at the end they pass the post-mortem inspection. With this inspection, it is guaranteed that the canal and the viscera of the animals that go to human consumption are exempt from diseases that pose a risk to the health of the consumer, because the veterinarian inspector has the obligation to ensure public health and must confiscate all those canals, parts of the canal or viscera that present pathologies. Determine which are these pathologies that cause the main seizures in equine livestock destined for human consumption is the objective of this study.

Materials and Methods

The study is carried out in a slaughterhouse in the province of Valencia. The study period includes the year 2016 and the months from January to April 2017; specifically during Mondays, Wednesdays and Fridays, which are the days when the horses are slaughtered, because this slaughterhouse is not exclusively dedicated to the sacrifice of horses.

The study population corresponds to the total number of horses arriving at this slaughterhouse in the mentioned period, which amounts to 794 inspected horses.

To develop the work, the information of the inspections carried out during the day is collected in the document "Equine daily inspection part", from the General Directorate of Health Public of the Conselleria de Sanitat Universal i Salut Pública, and subsequently the data is registered in the ISSA program (Integration of Food Safety Systems) to remain stored in the database of the Ministry of Health, considering possible future consultations and / or audits.

During ante-mortem inspection and post-mortem inspection, the slaughterhouse veterinary inspector complete the daily inspection part, recording the number of seizures generated during the working day, as well as the cause of that seizures.

The study focuses, therefore, on identifying the pathologies that cause these seizures in the solipeds without taking into account intrinsic characteristics of the animal, such as race, age or sex, nor the time of sacrifice.

Each cause of confiscation is represented in the daily part with a code that reflects the pathology detected in the animal or its organs. The codes used for the opinion of unfitness for human consumption, listed below, are regulated by the Procedure A12-P27-ASA of the General Directorate of Public Health:

P8 → Degenerations

U → Veterinary criterion

P26 → Inflammation

P1 → Abscesses

S → Contamination

H7 → Presence of *Fasciola hepatica*

Knowing the total sacrifices that have been made, both in 2016 and in the months from January to April 2017, and having registered the amount of seizures generated by each one of the possible pathologies, we proceed to the descriptive statistical analysis of the data, using as a working tool, the Microsoft Excel 2010 program, and then we determine which are the diseases that cause the greatest amount of seizures in this animal species in this slaughterhouse from the province of Valencia.

Results and Discussion

615 horses were sacrificed during 2016. No animal was rejected as not suitable for slaughter during the ante-mortem inspection. In the post-mortem inspection, most of the seizures generated in the slaughterhouse were partial, which means that certain parts of the slaughtered animal were removed from human consumption, and only in one case was a total seizure recorded. The presence of melanosis was the reason why the entire carcass of the animal and its edible viscera were removed from human consumption. The partial seizures are reflected in the table:

Causes of equine confiscation in 2016

TOTAL NUMBER OF HORSES = 615							
	Degenerations (P8)	Veterinary Criterion (U)	Inflammations (P26)	Abscesses (P1)	Contamination (S)	Fasciolosis (H7)	TOTAL
Liver	57	70	2	2	5	3	139
Lung		70	130		5		205
Heart		70	3		5		78
Kidney		35	5				40
Others			4	16			20
TOTAL	57	245	144	18	15	3	

In 2017 the study was carried out during the months of January to April, where a total of 179 horses were slaughtered, not declaring any animal as not suitable for slaughter during the ante-mortem inspection. The seizures generated during the post-mortem inspection in the slaughterhouse were all partial, with no case of total confiscation.

Causes of equine confiscation in 2017 (from January to April)

TOTAL NUMBER OF HORSES = 179							
	Degenerations (P8)	Veterinary Criterion (U)	Inflammations (P26)	Abscesses (P1)	Contamination (S)	Fasciolosis (H7)	TOTAL
Liver	21	18		2		3	44
Lung		18	28				46
Heart		18	3				21
Kidney		18					18
Others				9			9
TOTAL	21	72	31	11	0	3	

During the development of the study, the trichina tests performed on the muscle of all the domestic solipeds subjected to the study were negative.

Both in 2016 and in the months that elapsed in 2017, partial seizures prevailed over total seizures. In relation to partial seizures, lungs were the most confiscated organs in both years and the main diseases found throughout the present study were the following:

- Total confiscations
 - Melanosis
- Partial confiscations
 - Degenerations (calicosis)
 - Fasciolosis
 - Abscesses
 - Inflammations
 - Hepatitis
 - Myocarditis and Pericarditis
 - Nephritis
 - Pneumonia
 - Veterinary criterion
 - Old animals
 - Xanthomatosis
 - Empies of guttural bags
 - Accumulation of heavy metals

Comparing these data with the study carried out by Fàbregas where 327 horses were analyzed from 1992 to February 1993 in Barcelona, it can be observed that the total seizures are sporadic. The total seizures reached in the work of Fàbregas account for 0.9%, they only detected two cases of melanosis and one case of jaundice, data similar to 0.1% of total seizures obtained in the present study for a case of melanosis. In Barcelona as well as in the Valencia slaughterhouse, the predominant seizures were partial

seizures. The organs most confiscated by Fàbregas were the livers (17.7%), a fact that differs slightly if we compare it with the livers confiscated in our study (23.04%). In reference to the lungs, 14% were confiscated compared to 31.6% of the cases obtained in the Valencian slaughterhouse. As it can be interpreted from both studies, liver and lungs are the viscera with the most seizures. The search for trichina made in Barcelona gave negative results as in our work.

In several studies conducted in Chile, both in 1986 and in 2014, the predominant cause of seizures in equine livestock was fasciolosis. In 1986, the study was conducted in several regions where the first cause of seizures was the presence of liver problems, followed by findings in the lungs and kidneys. Among the liver problems, the predominant cause was the presence of *Fasciola hepatica* in the liver. The same thing that happened in 2014 where a total of 52,611 horses were slaughtered and 10,326 animals presented the parasite.

The environmental conditions and management during the rearing of animals must be taken into account when we compare studies, because such conditions may favor the appearance of certain pathologies. In Chile, there are no farms for equine meat production, only old animals from other activities such as racing or draft horses are slaughtered. In addition, horses in these countries live in the pastures, so *Fasciola hepatica* that is present in the pastures, comes in contact with the animals continuously and produce their characteristic lesions in a greater number of animals, that is why the prevalence is greater than in our study.

Conclusions

The results obtained from this study show that hardly any unfit test results are produced in the ante-mortem inspection of domestic solipeds, that partial seizures are more frequent than total seizures and that lungs are the most confiscated organs, followed by liver, heart and kidneys.

The results obtained also reflect that the main pathologies causing seizures in equine livestock destined for human consumption are pneumonias, followed by a large number of viscera confiscated by decision and criterion of the official veterinarian. It should also be noted, the removal of viscera from the food chain by the presence of degeneration and contamination.

All the lesions detected during the study period are characteristic of each diseases described, and no abnormal findings are found.

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